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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.          | CONFIRMATION NO. |
|---|-------------|----------------------|------------------------------|------------------|
| 10/718,887  | 11/21/2003  | Ping Xu              | AMAT/5620.C1/DSM/LOW<br>K/JW | 1671             |
| 44257   | 7590        | 04/19/2005           | EXAMINER<br>HOANG, QUOC DINH |                  |
| MOSER, PATTERSON & SHERIDAN, LLP<br>APPLIED MATERIALS, INC.<br>3040 POST OAK BOULEVARD, SUITE 1500<br>HOUSTON, TX 77056 |             |                      | ART UNIT<br>2818             |                  |

DATE MAILED: 04/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/718,887

Applicant(s)

XU ET AL.

Examiner

Quoc D. Hoang

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 May 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 28-49 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 28-38, 40-46 and 49 is/are rejected.
- 7) ☒ Claim(s) 29, 35, 36, 39-41 and 46-49 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 2-2004.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Response to Preliminary Amendment*

1. Preliminary Amendment filed on 5/06/2004 has been entered and made of record as Paper No. 05-2004. In Preliminary Amendment, applicants cancel claims 1-27. Claims 28-49 are newly added. Claims 28-49 are pending in the application.

### *Drawings*

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the ALL the limitations listed by claims 30, 35, 40, 44, 45, 46 must be shown or the feature(s) canceled from the claim(s). The limitations are: (a) 'photoresist adjacent the silicon oxide cap or nitrogen-free silicon carbide cap' (b) 'silicon oxide cap or nitrogen-free silicon carbide cap adjacent the second dielectric layer', and (c) 'nitrogen free silicon carbide cap adjacent the first dielectric layer'. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering

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of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

3. Claims 29, 35, 36, 40, 41, 46, and 49 are objected to because of the following informalities: Nowhere in the specification or in any figures shows or discloses the limitations "a photoresist adjacent the second dielectric layer" in claims 29, 36, 40 and 46, "a first dielectric layer adjacent a conductive layer" in claim 35, "third dielectric layer comprising silicon, oxygen, and carbon adjacent the etch stop" in claims 41 and 49. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 28-38, 40-46 and 49, as best understood, are rejected under 35 U.S. C. 102(e) as being anticipated by Lu et al., (U.S. Pat No. 6,812,134, hereafter "Lu").

Regarding claims 28-38, 40-46 and 49, Lu teaches a substrate, comprising: conductive material 204; a first dielectric barrier layer 202 comprising silicon, carbon, and nitrogen is formed on the conductive material 204 ; a nitrogen-free silicon and carbon containing material 206 (cap layer) the adjacent the first dielectric layer 202; a second dielectric layer 208 comprising silicon, oxygen, and carbon on the nitrogen-free silicon and carbon containing material 206; an SiC etch stop layer 210 adjacent the second dielectric layer 208, and a photoresist 213" adjacent the etch stop layer 210; a third dielectric layer 212" comprising silicon, oxygen, and carbon, adjacent the etch stop 210; and a photoresist 220" adjacent the third dielectric layer 212" (see col. 3, line 57 through col. 6, line 20 and Figs. 2A-2H").

***Allowable Subject Matter***

6. Claims 39, 47 and 48 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is a statement of reasons for the indication of allowable subject matter: Claim 39 recite, inter alia, a nitrogen doped silicon carbide etch stop layer adjacent the second dielectric layer, and nitrogen free silicon carbide cap adjacent the nitrogen doped silicon carbide layer. The art of record does not disclose or anticipate the limitation in combination with other claim element nor would it be obvious to modify the art of record so as to form a device including the above limitation.

8. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

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accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Conclusion***

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quoc Hoang whose telephone number is (571) 272-1780. The examiner can normally be reached on Monday-Friday from 8.00 AM to 5.00 PM.

If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone numbers of the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

  
Quoc Hoang  
Patent examiner/AU 2818

  
David Nelms  
Supervisory Patent Examiner  
Technology Center 2800